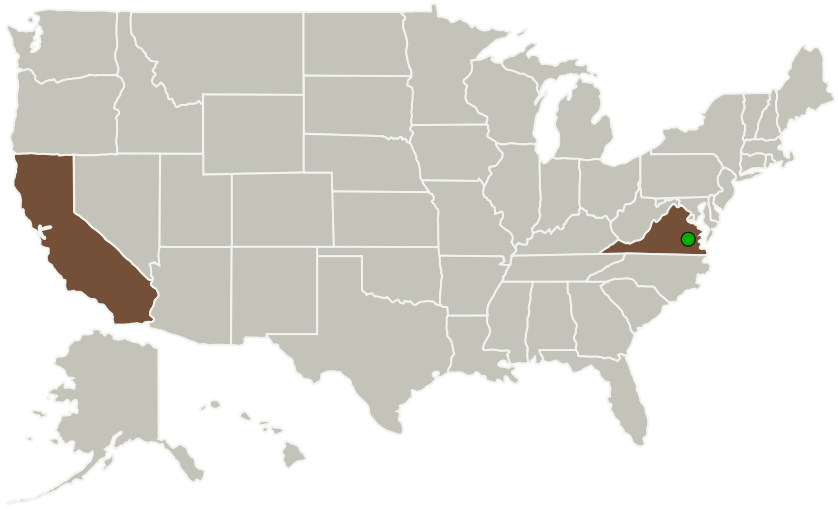
Composite Matrix Systems for Cryogenic Applications, Phase II

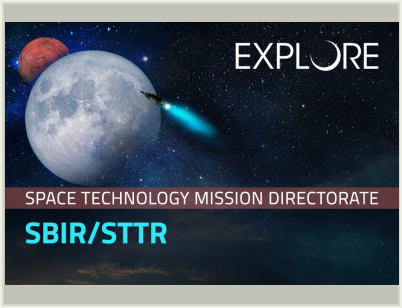
Completed Technology Project (2010 - 2012)

Project Introduction

As an alternative material to aluminum-lithium, cryotanks developed from fiber reinforced composites can offer significant weight savings in applications for fuel containment of liquid oxygen and hydrogen. For composite materials to be accepted and utilized in these structures, they must be resistant to microcracking. It is the objective of this work to develop a matrix system for aerospace composites that alleviates all forms of microcracking from cryogenic cycling regardless of the lay-up and configuration. This will be accomplished by using a novel chemistry that provides the necessary inherent network and backbone structure for this environment combined with newly developed nano-modifiers. This technology and approach will result in a high performance matrix system that has low or no cure shrinkage combined with very low CTE and extremely high toughness. Such a matrix will be combined with carbon fibers to fabricate lightweight, high performance composites that are expected to have the microcrack and permeability resistance required for cryotank structures.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Applied Poleramic, Inc.	Lead Organization	Industry	Benicia, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

January 2010: Project Start

January 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138896)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Applied Poleramic, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

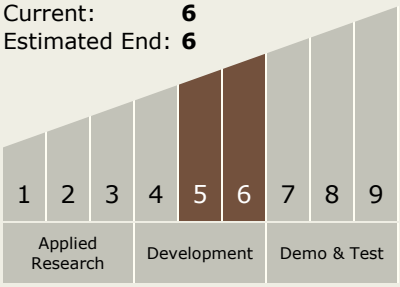
Carlos Torrez

Principal Investigator:

Richard Moulton

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System